

# PLEISTOCENE FORAMINIFERA FROM PORT FAIRY, WESTERN VICTORIA

*By A. C. Collins*

## Plate 1

### SUMMARY

Shell sands of Pleistocene age from the environs of Port Fairy, Victoria, contain foraminiferal assemblages which are similar in most respects to those of present Victorian beaches, but include a small tropical element indicating warmer-water conditions. One set of samples contains pelagic and deeper-water forms indicating deposition on an open ocean beach, the other has a limited assemblage suggesting lagoonal conditions. One hundred and twenty-six species are listed, of which four are described as new, the most interesting being a new species of the genus *Fabularia*, which places the upper limit of geological range of this genus in the Pleistocene instead of the Lower Pliocene as hitherto known.

### DESCRIPTION OF SAMPLES AND THEIR FORAMINIFERAL CONTENTS

Several samples of marine fossil material collected in the vicinity of Port Fairy, Western Victoria, were entrusted to the author for study by Mr. E. D. Gill, Palaeontologist, National Museum of Victoria. On examination they proved to contain an interesting foraminiferal fauna which throws some light on the climatic and ecological conditions prevailing at the time of their deposition. The author is glad to acknowledge the assistance rendered by Mr. Noel J. Shaw of the Museum staff, who selected many of the specimens here recorded, including the first-recognized specimen of the warm-water indicator *Amphisorus hemprichii*. The determinations of calcium carbonate were made by Mr. W. H. Edwards of the Chemistry Department, Gordon Institute of Technology, Geelong, to whom the author is also indebted for assistance.

The samples studied may be divided by their foraminiferal content into two groups, indicating different ecological conditions, as follows:

#### GROUP 1

Four samples of loose or consolidated shell sand from the following localities, collected by E. D. Gill, and a fifth sample collected by the author. They are described in detail below:

- Sample 1. "Drain on north boundary of Port Fairy (excavated material)."  
A fine brownish calcareous sand containing molluscan and bryozoan débris, sponge spicules, and a rich foraminiferal assemblage. After treatment with cold dilute hydrochloric acid a residue of 25.5% was left, composed largely of angular grains of clear quartz and reddish-brown nodules, presumably iron oxide.

- Sample 2. "Inland side of ridge on which Princes Highway runs, between Toolong Road and Glaxo Factory, and on both sides of next ridge inland for same distance including railway cutting at 185 miles." A fine even-grained light-coloured calcareous sand containing a foraminiferal assemblage similar to that of Sample 1, but not so rich in species. A residue of 28.2% was left after treatment with acid, consisting mainly of clear angular quartz grains and sponge spicules.
- Sample 3. "Cliff on south bank of Moyne River  $\frac{1}{2}$ -mile E.N.E. of Rosebrook Bridge." A fawn-coloured calcareous sand, fine in texture but partly cemented into irregular nodules. The uncemented material was similar in nature to Sample 2, 24% residue being left after treatment with acid.
- Sample 4. "Port Fairy military map reference 216717. Shells in dune sand and consolidated limestone." This material was completely cemented and rather more calcareous in composition than the other samples, 16% of residue being left after acid treatment. Examination of scrapings indicated that the foraminiferal assemblage was generally similar to the other samples and no further examination was made.
- Sample 5. Coarse unconsolidated shell-grit immediately below travertine layer in bank of drain on north boundary of Port Fairy, map reference 176678. This material was collected by the author. The finer fractions, consisting of a coarse shell-sand, almost entirely calcareous, produced many specimens of the larger miliolids, discorbines, etc. (Same locality as Sample 1.)

Generally speaking, the assemblages found in these five samples show marked resemblances to one another, the variations being only such as are found in different sections of a recent beach, due to varying conditions of deposition. As these differences appear to be due to such local variations, having no climatic, ecological or age significance, results have been combined in a single faunal list below. Type slides of each locality studied have, however, been deposited at the National Museum.

As with most beach collections they represent a thanatocoenosis, containing both shallow-water species and current-borne pelagic and deeper-water species. The faunule as a whole is substantially similar to that of ocean beach deposits on the Victorian coast, with the addition of a small but definite shallow-water tropical element. The pelagic species found are those which Wiseman and Ovey (1951) have shown to be warm-temperate or warm-water forms. Since the same species are found in recent beach deposits in the same area, no definite evidence of climatic change is given, but warmer conditions are not contra-indicated.

The species *Haddonia* cf. *minor* Chapman and *Amphisorus hemprichii* Ehrenberg, on the other hand, are strong evidence of warmer conditions, since their present habitat is in coral reef areas of the tropics. *Peneroplis pertusus* (Forskål) and *Discorbis*

*mira* Cushman are also warm-water forms, by the evidence of their general distribution, though *P. pertusus* has been recorded once from the Victorian coast (Chapman 1907) and *D. mira* from Glenelg, South Australia (Parr 1943). These warm-water indicating species were comparatively rare in the samples. In the case of such species as *Amphisorus hemprichii* and *Peneroplis pertusus* which in their normal habitat usually occur in great profusion, this comparative rarity suggests that they were close to the southern limit of their range.

Howchin (1923, 1935) records *Marginopora vertebralis* (as *Orbitolites complanata*) and ?*Amphisorus hemprichii* (as *Orbitolites duplex*) from the Pleistocene of the Adelaide area. The evidence of the present work is consistent with this record, and indicates a somewhat more temperate climate under the influence of open oceanic exposure and some 3° more south latitude.

The following list of species is recorded from the samples of Group 1.

- \**Textularia pseudogramen* Chapman and Parr.
- \**Gaudryina* (*Pseudogaudryina*) *hastata* Parr.
- \**Clavulina difformis* Brady.
- \**Quinqueloculina baragwanathi* Parr.
- \**Q. bradyana* Cushman.
- \**Q. costata* d'Orbigny.
- \**Q. lamarekiana* d'Orbigny.
- Q. moynensis* sp. nov.
- \**Q. subpolygona* Parr.
- \**Massilina lapidigera* (Howchin and Parr).
- \**Spiroloculina angusteoralis* Parr.
- \**S. antillarum* d'Orbigny.
- \**S. disparilis* Terquem.
- \**Signoilina australis* (Parr).
- \**Triloculina circularis* Bornemann, var. *sublineata* (Brady).
- \**T. labiosa* d'Orbigny.
- \**T. labiosa* d'Orbigny, var. *schauinslandi* (Rhumbler).
- \**T.* sp. cf. *oblonga* (Montagu).
- \**T. subrotunda* (Montagu).
- \**T. tricarinata* d'Orbigny.
- \**T. trigonula* (Lamarek).
- \**T. striatotrigonula* Parker and Jones.
- \**Pyrgo depressa* (d'Orbigny).
- Biloculinella globula* (Bornemann).
- Fabularia lata* sp. nov.
- \**Ophthalmidium circularis* (Chapman).
- Planispirinella tenuis* sp. nov.
- Nubecularia lucifuga* DeFrance.
- \**Parrina bradyi* (Millett).
- Haddonia* sp. cf. *minor* Chapman.
- \**Dentalina mutsui* Hada.
- \**Amphicoryne scalaris* (Batsch).
- \**Vaginulina vertebralis* Parr.
- \**Lagena distoma-margaritifera* Parker and Jones.
- \**L. distoma-margaritifera* P. and J., var. *victoriensis* Parr.
- \**L. gracillima* (Seguenza).
- \**L. acuticosta* Reuss, var. *ramulosa* Chapman.
- \**L. scmistriata* Williamson.
- L. spiralis* Brady.
- \**L. striata* (d'Orbigny).
- \**L. sulcata* (Walker and Jacob).
- \**Oolina ampulla-distoma* (Rymer Jones).
- O. costata* (Williamson).
- \**O. globosa* (Montagu).
- \**O. hexagona* (Williamson).
- \**O. squamosa* (Montagu).
- \**O. tasmanica* Parr.
- \**O. variata* (Brady).
- \**Fissurina clathrata* (Brady).
- \**F. lacunata* (Burrows and Holland).
- F. marginato-perforata* (Seguenza).
- \**F. orbignyana* (Seguenza), var.
- \**Guttulina regina* (Brady).



- \**Globulina gibba* d'Orbigny, var.  
*globosa* Münster.
- \**Sigmoidella kagaensis* Cushman and Ozawa.
- \**Elphidium argenteum* Parr.  
*E. crispum* (Linne).
- \**E. macellum* (Fichtel and Moll).  
*E. rotatum* Howchin and Parr.
- \**Parrellina verriculata* (Brady).
- \**Nolorotalia elathrata* (Brady).
- \**Peneroplis perlusus* (Forskål).
- Amphisorus hemprichii* Ehrenberg.
- \**Bolivina folium* (Parker and Jones).  
*Buliminella gracilis* sp. nov.
- \**Bulimina marginata* d'Orbigny.
- \**Bolivina compacta* Sidebottom.
- \**B. pseudoplicata* Heron-Allen and Earland.
- \**B. robusta* Brady.
- \**B. subreticulata* Parr.  
*B. subtenuis* Cushman.
- \**Rectobolivina digitala* Parr.
- \**Uvigerina bassensis* Parr.
- \**Siphogenerina raphanus* (Parker and Jones).
- \**Angulogerina angulosa* (Williamson).  
*Trifarina bradyi* Cushman.
- \**Spirillina vivipara* Ehrenberg.
- \**S. denticulata* Brady.
- \**S. inaequalis* Brady.
- \**Turrispirillina depressa* Parr.
- \**Patellina corrugata* Williamson.
- \**Patellinella inconspicua* (Brady).
- \**Annulopatellina annularis* (Parker and Jones).
- \**Discorbis australensis* Heron-Allen and Earland.
- \**D. australis* Parr.
- \**D. dimidiatus* (Parker and Jones).  
*D. dimidiatus* (P. and J.), var. *acervulinoides* Parr.
- \**D. haliotis* Heron-Allen and Earland.  
*D. mira* Cushman.
- \**D. orbicularis* (Terquem).
- \**D. pulvinatus* (Brady).
- \**Discorbinnella biconcava* (Jones and Parker).
- \**D. disparilis* (Heron-Allen and Earland).
- \**D. planoconca* (Chapman, Parr and Collins).
- \**Heronallenia translucens* Parr.
- \**Valvulineria collinsi* (Parr).
- \**Stomatorbina concentrica* (Parker and Jones).  
*Mississippina pacifica* Parr.
- \**Streblus beccarii* (Linne).
- \**Siphonina tubulosa* Cushman.
- \**Baggina philippinensis* Cushman.
- \**Tretomphalus concinnus* (Brady).
- \**T. planus* Cushman.
- \**Cassulinoides chapmani* Parr.
- \**Ehrenbergina pacifica* Cushman, var. *aspinosa* Parr.
- \**Globigerina bulloides* d'Orbigny.
- \**Globigerinoides conglobata* (d'Orbigny).
- \**G. ruber* (d'Orbigny)
- \**Orbulina universa* d'Orbigny.
- \**Globorotalia crassula* Cushman and Stewart.
- \**G. hirsuta* (d'Orbigny).
- \**G. truncatulinoides* (d'Orbigny).
- \**Cibicides lobatulus* (Walker and Jacob).
- \**C. pseudoungerianus* (Cushman).
- \**C. subhaidingeri* Parr.  
*Vagoebides* sp. cf. *maoria* Finlay.
- \**Dyoeibicides biserialis* Cushman and Valentine.
- \**D. laevis* Parr.  
*Cyclocibicides vermieulatus* (d'Orbigny).
- \**Planorbulina mediterraneanensis* d'Orbigny.
- \**Acervulina inhaerens* Schultze.
- \**Gypsina vesicularis* (Parker and Jones).

Species marked \* have been previously recorded from the Victorian coastline or Bass Strait.

## GROUP 2

One sample only. "Right bank of Moyne River, 0.6 mile slightly east of north of Rosebrook, Western Victoria." A dark grey coherent material washing down to a calcareous sand composed of

comminuted shells, etc., with some angular quartz grains and small aggregations of what appears to be carbonaceous material.

The foraminiferal fauna is scanty but ecologically interesting. The dominant forms are *Streblus beccarii* (L.), *Elphidium crispum* (L.), and *Discorbis dimidiatus* (P. and J.). Besides these there is a scattering of species which with one or two exceptions occur in the samples of the previous group.

This assemblage is also a thanatocoenosis. The specimens of *Streblus* are perfect and comparable with recent tests, whereas the tests of all other species are more or less eroded, with the ornament and sharp edges smoothed off in a manner suggesting wind-polishing rather than wave action. From this it may be deduced that the conditions of deposition were those of a brackish-water lagoon in which *Streblus* would flourish, cut off from the sea by a sand-bar from which tests of the less adaptable marine species were derived by wind and possibly wave action. The assemblage of species probably derived in this way is closely related to those found in the samples of Group 1, but is not identical and probably represents a different facies. There is a complete and rather surprising absence of miliolid genera for which no explanation has been found.

Some indication is given of climatic conditions by the presence of a worn specimen referable to *Operculina*, a genus not represented in the samples of Group 1. Its presence is, however, consistent with the records of *Amphisorus* and *Haddonina*, and it provides further evidence of warm-water conditions. Two badly-worn examples of a spinous rotalid of the *R. calcar* group were found in this sample. These forms also have a predominantly warm-water distribution.

The following list of species is recorded from the above sample:

- |   |  |
|---|--|
| * <i>Textularia sagittula</i> Defrance.                         | * <i>Discorbis dimidiatus</i> (Parker and Jones).                |
| * <i>Lagena acuticosta</i> Reuss, var. <i>ramulosa</i> Chapman. | * <i>Discorbinella planoconcava</i> (Chapman, Parr and Collins). |
| * <i>Sigmoidella kagaensis</i> Cushman and Ozawa.               | * <i>Streblus beccarii</i> (Linne).                              |
| * <i>Guttulina regina</i> (Brady).                              | <i>Rotalia</i> sp. (calcar group).                               |
| <i>Elphidium crispum</i> (Linne).                               | * <i>Globigerina bulloides</i> d'Orbigny.                        |
| * <i>E. sculpturatum</i> Cushman.                               | * <i>Gypsina vesicularis</i> (Parker and Jones).                 |
| <i>E. rotatum</i> Howchin and Parr.                             | <i>Operculina</i> sp.  |
| * <i>Bulimina marginata</i> d'Orbigny.                          |  |
| * <i>Bolivina pseudoplicata</i> Heron-Allen and Earland.        |  |
| * <i>Uvigerina bassensis</i> Parr.                              |  |
| * <i>Siphogenerina raphanus</i> (Parker and Jones).             |  |

Species marked \* have been previously recorded from the Victorian coastline or Bass Strait.

## NOTES ON NEW AND INTERESTING SPECIES

## Family MILIOLIDAE

Genus QUINQUELOCULINA d'Orbigny 1826

*Quinqueloculina moynensis* sp. nov.

Pl. I, figs. 1a-c

Test small, subquadrate, about twice as long as wide, quinqueloculine, chambers smooth with a rounded limbate keel, aperture elliptical with a small simple tooth at the end of a short blunt neck. Dimensions of holotype: length 0.55 mm., width 0.29 mm., thickness 0.19 mm., from sample 2, where it is not uncommon. Holotype in National Museum of Victoria, Reg. No. P 15666.

This small species appears to have no close relation to any described form, its particular features being the subquadrate outline and strongly keeled chambers. It has not been met with in recent material. The specific name relates to the Moyne River, which runs through the general area of these collections.

Genus FABULARIA Defrance 1820

*Fabularia lata* sp. nov.

Pl. I, figs. 2a, b; 3a, b; 4a, b

Test oval to subcircular in outline, with ends somewhat truncate, compressed at right angles to the plane of coiling, margins rounded. Aperture narrow, extending over the full width of the apertural end and consisting of a double row of pores with limbate margins. Plan of growth quinqueloculine in earliest stages, then triloculine, and finally biloculine, at which stage the chambers become subdivided by meridional partitions which end short of the aperture. Fig. 3 shows a sectioned specimen having a proloculum 0.05 mm. in diameter, then a quinqueloculine and triloculine stage of 6 chambers followed by a biloculine stage of 11 chambers, making 17 in all. Fig. 4, a section of another specimen, has a proloculum 0.025 mm. in diameter, then an irregularly quinqueloculine (or sigmoid) and triloculine stage of 9 chambers followed by a biloculine stage of 13 chambers making 22 in all. These possibly represent respectively the megalospheric and microspheric forms of the species.

Dimensions of holotype: length 2.16 mm., width 2.16 mm., thickness 1.0 mm., from sample 1. It is common in the coarser sediments of sample 5. Holotype in the National Museum of

Victoria, Reg. No. P 15667. Paratypes (2) Reg. Nos. P 15668 (fig. 3) and P 15669 (fig. 4).

This species may be compared with *F. howchini* Schlumberger, described from the Lower Pliocene of Hamilton, Victoria; from which it differs in its subcircular, truncate and compressed test and by its long narrow aperture. The present record is of particular interest in that it extends the geological range of the genus, previously known from the Eocene of Europe, North Africa and America and the Lower Pliocene of Australia, to the Pleistocene, in company with an assemblage of species of recent character. The two Australian records of the genus are from localities in the same geographical area, some fifty miles apart, indicating the persistence of the genus in this area almost to recent times.

It may be noticed that the compressed form of the test takes what appears to be an evolutionary trend in the genus a step further, Eocene species being compressed laterally, the Australian Pliocene species subfusiform and the present species compressed frontally. Immature specimens (judged by their size) of *F. lata* tend to be comparatively more slender and fusiform, the compressed and laterally expanded form being taken on in the last few chambers.

### Family OPHTHALMIDIIDAE

#### Subfamily OPHTHALMIDIINAE

#### Genus PLANISPIRINELLA Wiesner 1931

#### *Planispirinella tenuis* sp. nov.

#### Pl. I, fig. 5

Test minute, porcellaneous, thin, with a rounded proloculum followed by an undivided planispiral tube of about 3 convolutions, gradually increasing in diameter, then becoming septate, the first chamber taking up about  $\frac{2}{3}$  of a convolution and the next two  $\frac{1}{2}$  and  $\frac{1}{4}$  respectively. Both faces are slightly concave and sutures are depressed. Chambers are subcircular in section, forming a rounded periphery, with the aperture formed by the slightly constricted open end of the last chamber. Diameter of holotype 0.17 mm. Rare in sample 1. Holotype in National Museum of Victoria, Reg. No. P 15665.

This minute species differs from *P. exigua* (Brady) in its regular spiral outline, rounded periphery and concave faces, the early chambers being distinct and not obscured by shell growth.



Family PLACOPSILINIDAE  
 Subfamily POLYPHRAGMINAE  
 Genus HADDONIA Chapman 1898  
*Haddonia* sp. cf. *minor* Chapman

Pl. I, fig. 6

Cf. *Haddonia minor* Chapman 1902, p. 384, pl. 36, figs. 1, 2.

Four specimens referable to this genus were found. In form they resemble *H. torresiensis* Chapman, but their small size, *circa* 2 mm., precludes their reference to this species and they are placed tentatively in Chapman's second species *H. minor*. The specimens differ from Chapman's figures in their lower and more regular chambers and the apertural characteristics which are closer to those of *H. torresiensis*, and it is possible that they represent a new species. Two of the specimens are conjoined, one having evidently grown on the other as a surface of attachment. The genus has a generally tropical distribution and has not hitherto been recorded from southern Australian localities. From samples 1 and 5, the figured specimen being from sample 1.

Family NONIONIDAE

Genus ELPHIDIUM Montfort 1808

*Elphidium rotatum* Howchin and Parr

*Elphidium rotatum* Howchin and Parr 1938, p. 299, pl. xvii,  
 figs. 1, 2, 4.

The type of this species came from recent shoresands at Kingston, South Australia, and it is recorded from the Upper Pliocene of the Adelaide area. It has not hitherto been recorded from Victoria. Rare in sample 5 of Group 1, and in Group 2.

Family PENEROPLIDAE

Subfamily SPIROLININAE

Genus PENEROPLIS Montfort 1808

*Peneroplis pertusus* (Forskål)

*Nautilus pertusus* Forskål 1775, p. 125, No. 65.

*Peneroplis pertusus* Brady 1884, p. 204, pl. xiii, figs. 16, 17.  
 Chapman 1907, p. 126.

Two specimens of this well-known warm-water form were found. It has been recorded from Point Nepean, Victoria, by



Chapman; and the author has also found it in Victorian shore-sand. It is a common species in Northern Australian waters but strangely enough has not been recorded from Gulf St. Vincent, South Australia, where a related species, *P. planatus* (Fichtel and Moll) is abundant.

Subfamily ORBITOLITINAE

Genus AMPHISORUS Ehrenberg 1840

*Amphisorus hemprichii* Ehrenberg

*Amphisorus hemprichii* Ehr. 1838, p. 134, pl. iii, fig. 3.

? *Orbitolites duplex* Carpenter, Howchin 1935, p. 69.

*A. hemprichii* Howchin and Parr 1938, p. 301, pl. xix, fig. 7.

This is probably the form recorded by Howchin (as *Orbitolites duplex*) from the Pleistocene of the Adelaide plain. It is further recorded by Howchin and Parr from the Upper Pliocene of Adelaide and is a common species in the warm waters of Northern Australia. It does not appear to have been recorded from Southern Australia as a recent form, and its presence in the material examined is a fairly good indication of warmer water conditions than at present. Not uncommon in the coarse grit of sample 5, rare in the other samples of Group 1.

Family BULIMINIDAE

Subfamily VIRGULININAE

Genus BOLIVINA d'Orbigny 1839

*Bolivina subtenuis* Cushman

Pl. I, fig. 7.

*Bolivina tenuis* Brady, (*non* Marsson) 1881, p. 57, 1884, p. 419, pl. 52, fig. 29.

*B. subtenuis* Cushman, 1936, p. 57, pl. 8, fig. 10.

Examples of a peculiar bolivine of oval outline, having long curved chambers tending to become sharply recurved at the inner end, giving the appearance of subdivision, were fairly common in the finer fractions of the Group 1 samples. The aperture is slit-like with radiating lines extending over the end of the last chamber and placed well to one side of the test. In many specimens the shell wall in the vicinity of the aperture is broken or resorbed, giving the appearance of a roughly oval aperture as figured by Cushman, but in perfect specimens the aperture is obscure and defined by the radial pattern of ornament, as in Brady's fig. 29.

The specimens are referable to the above species, which appears to have no closely related forms. Its distribution has hitherto been confined to the tropical Indo-Pacific. The figured specimen is from sample 1.

Subfamily TURRILININAE

Genus BULIMINELLA Cushman 1911

*Buliminella gracilis* sp. nov.

Pl. I, figs. 8a, b.

Test elongate, tapering, subcylindrical, rounded at initial end and obliquely truncate at the oral end. Chambers numerous and narrow, arranged in a close spiral of up to 4 convolutions. Sutures broadly limbate, spiral suture distinct and depressed. Surface smooth and finely punctate. Aperture small, obscure, in centre of depressed apertural face, with radial striae on the face of the last chamber. Dimensions of holotype: length 0.49 mm., width 0.14 mm., from sample 1. Not uncommon in the finer fractions of Group 1 samples. Holotype in National Museum of Victoria, Reg. No. P 15664.

The subcylindrical form and oblique truncate oral end of this species suggest relationship with *Buliminoides*, but it lacks the development of costae parallel or nearly so to the direction of spiral growth. It differs from *Elongobula* in the regular spiral sequence of chambers, more typical of *Buliminella*.

Its relationship appears to be with forms such as *B. multicamera* Cushman and Parker; described from the Pliocene of Castel Arquato, Italy, and recorded as a recent form from the Mediterranean and Indo-Pacific. It differs from that species in its slenderness and heavily limbate sutures. Some specimens show an irregular variation in the length of chambers, giving the effect of a tendency toward biseriality as described for *B. multicamera*. In the present species, however, this irregularity occurs at random and does not suggest an evolutionary tendency. A closely related form occurs in the recent shoresands of the Victorian coast.

Family ROTALIIDAE

Subfamily TURRISPIRILLININAE

Genus TURRISPIRILLINA Cushman 1927

*Turrispirillina depressa* Parr

*Turrispirillina depressa* Parr, 1950, p. 351, pl. xiii, figs. 17 and 18.

Described by Parr from off Tasmania, this is a further interesting occurrence of a seldom-recorded genus. One specimen was found, closely similar to Parr's fig. 18.

Subfamily DISCORBINAE  
Genus DISCORBIS Lamarek 1804  
*Discorbis mira* Cushman

*Discorbis turbo* Brady (*non d'Orbigny*) 1884, p. 142, pl. 87, figs. 8a-c.

*D. mira* Cushman 1922, p. 39, pl. 6, figs. 10 and 11.

Recorded by Parr (1943) from recent shoresands at Glenelg, South Australia. Chapman's record of *D. turbo* (1907, p. 134) may refer to this species, otherwise it has not hitherto been recorded from Victoria. From its recorded distribution it is evidently a warm-water form. It occurs in the Pliocene of southern Australia (*vide* Parr).

Subfamily SIPHONININAE  
Genus SIPHONINA Reuss 1850  
*Siphonina tubulosa* Cushman

*Truncatulina reticulata* Brady, (*non Czjek*), 1884, p. 669, pl. 96, figs. 5-7.

*Siphonina tubulosa* Cushman 1924, p. 40, pl. 13, figs. 1 and 2, 1927, p. 10, pl. 1, figs. 3a-c, 5a-c, Parr 1950, p. 362.

This species, recorded by Brady from Bass Strait, has not to my knowledge been recorded since from Victoria, though it has been found in the tropical Indo-Pacific, and off Tasmania.

Family ANOMALINIDAE  
Subfamily CIBICIDINAE  
Genus VAGOCIBICIDES Finlay 1939  
*Vagocibicides cf. maoria* Finlay

Pl. I, figs. 9a-c.

Cf. *Vagocibicides maoria* Finlay, 1939, p. 236, pl. 29, figs. 146-151, 158.

One specimen, figured here, was found in sample 3. It appears to be fairly close to Finlay's species from the Tertiary of New Zealand. A similar form which may also be referable to this species has been found by the author in recent beach sands from Tidal River, Wilson's Promontory, Victoria.

This form appears to be derived from *Dyocibicides* by the gradual assumption of uniserial growth combined with the coming-together and fusion of the dorsal margins of the last chamber so that it becomes sub-globular. This fusion is shown in the figured specimen by the slightly depressed groove ending at the aperture.

More specimens are needed to establish the limits of variation of this form and it is therefore provisionally referred as above. The figured specimen is from sample 3.

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## EXPLANATION OF PLATE I

- Fig. 1. *Quinqueloculina moynensis* sp. nov. Holotype, *a* and *b* side views, *c* oral view. x 80. P 15666.
- Fig. 2. *Fabularia lata* sp. nov. Holotype. *a* side view, *b* oral view. x 20. P 15667.
- Fig. 3. *F. lata* sp. nov. Paratype. *a* transverse section, x 20; *b* early chambers enlarged, x 80. P 15668.



- Fig. 4. *F. lata* sp. nov. Paratype. *a* transverse section, x 20; *b* early chambers enlarged, x 80. P 15669.
- Fig. 5. *Planispinella tenuis* sp. nov. Holotype. Side view. x 140. P 15665.
- Fig. 6. *Haddonina* sp. cf. *minor* Chapman. x 30. P 15663.
- Fig. 7. *Bolivina subtenuis* Cushman. x 80. P 15663.
- Fig. 8. *Buliminella gracilis* sp. nov. Holotype. *a* side view, *b* oral view. x 80. P 15664.
- Fig. 9. *Vagocibicides* sp. cf. *maoria* Finlay. *a* dorsal view, *b* ventral view, *c* oral view. x 80. P 15663.